

SEQUENCE LISTING

<110> EBL GmbH

<120> Method for the production of protamine

<130> Protamin

<140>

<141>

<160> 36

<170> PatentIn Ver. 2.1

<210> 1

<211> 102

<212> DNA

<213> Oncorhynchus mykiss

<220>

<221> CDS

<222> (1)..(99)

<220>

<223> aa sequence derived from ORF of nucleotide
sequence

<400> 1

atg	ccc	aga	aga	cgc	aga	tcc	tcc	agc	cga	cct	gtc	cgc	agg	cgc	cgc	48
Met	Pro	Arg	Arg	Arg	Arg	Ser	Ser	Ser	Arg	Pro	Val	Arg	Arg	Arg	Arg	
1				5				10				15				
cgc	ccc	agg	gtg	tcc	cga	cgt	cgt	cgc	agg	aga	gga	ggc	cgc	agg	agg	96
Arg	Pro	Arg	Val	Ser	Arg	Arg	Arg	Arg	Arg	Arg	Gly	Gly	Arg	Arg	Arg	
			20					25				30				
cgt	tag															102
Arg																

<210> 2

<211> 33

<212> PRT

<213> Oncorhynchus mykiss

<223> aa sequence derived from ORF of nucleotide
sequence

<400> 2

Met Pro Arg Arg Arg Arg Ser Ser Ser Arg Pro Val Arg Arg Arg Arg
 1 5 10 15

Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg
 20 25 30

Arg

<210> 3

<211> 102

<212> DNA

<213> Oncorhynchus mykiss

<220>

<221> CDS

<222> (1)..(99)

<220>

<223> aa sequence derived from ORF of nucleotide
 sequence

<400> 3

atg ccc aga aga cgc aga tcc tcc aga cca cct gtc cgc agg cgc cgc 48
 Met Pro Arg Arg Arg Arg Ser Ser Arg Pro Pro Val Arg Arg Arg Arg
 1 5 10 15

cgc ccc agg gtg tcc cga cgt cgt cgc agg aga gga ggc cgc agg agg 96
 Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg
 20 25 30

cgt tag 102
 Arg

<210> 4

<211> 33

<212> PRT

<213> Oncorhynchus mykiss

<223> aa sequence derived from ORF of nucleotide
 sequence

<400> 4

Met Pro Arg Arg Arg Arg Ser Ser Arg Pro Pro Val Arg Arg Arg Arg
 1 5 10 15

Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg
 20 25 30

Arg

<210> 5

<211> 102

<212> DNA

<213> Oncorhynchus mykiss

<220>

<221> CDS

<222> (1)..(99)

<220>

<223> aa sequence derived from ORF of nucleotide
 sequence

<400> 5

atg ccc aga aga cgc aga tcc tcc aga cga cct gtc cgc agg cgc cgc 48
 Met Pro Arg Arg Arg Arg Ser Ser Arg Arg Pro Val Arg Arg Arg Arg
 1 5 10 15

cgc ccc agg gtg tcc cga cgt cgt cgc agg aga gga ggc cgc agg agg 96
 Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg
 20 25 30

cgt tag 102
 Arg

<210> 6

<211> 33

<212> PRT

<213> Oncorhynchus mykiss

<223> aa sequence derived from ORF of nucleotide
 sequence

<400> 6

Met Pro Arg Arg Arg Arg Ser Ser Arg Arg Pro Val Arg Arg Arg Arg
 1 5 10 15

Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg
 20 25 30

Arg

<210> 7

<211> 102

<212> DNA

<213> Oncorhynchus mykiss

<220>

<221> CDS

<222> (1)..(99)

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<223> aa sequence derived from ORF of nucleotide
sequence

<400> 7

atg	ccc	aga	aga	cgc	aga	tcc	tct	agc	cga	cct	gtc	cgc	agg	cgc	cgc	48
Met	Pro	Arg	Arg	Arg	Arg	Ser	Ser	Ser	Arg	Pro	Val	Arg	Arg	Arg	Arg	
1				5					10					15		

cgc	gcc	agg	gtg	tcc	cga	cgt	cgt	cgc	agg	aga	gga	cgc	cgc	agg	agg	96
Arg	Ala	Arg	Val	Ser	Arg	Arg	Arg	Arg	Arg	Arg	Gly	Arg	Arg	Arg	Arg	
			20					25					30			

cgt	tag															102
Arg																

<210> 8

<211> 33

<212> PRT

<213> Oncorhynchus mykiss

<223> aa sequence derived from ORF of nucleotide
sequence

<400> 8

Met	Pro	Arg	Arg	Arg	Arg	Ser	Ser	Ser	Arg	Pro	Val	Arg	Arg	Arg	Arg
1					5				10					15	

Arg	Ala	Arg	Val	Ser	Arg	Arg	Arg	Arg	Arg	Arg	Gly	Arg	Arg	Arg	Arg
			20					25						30	

Arg

<210> 9
 <211> 102
 <212> DNA
 <213> Oncorhynchus mykiss

<220>
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 <222> (1)..(99)

<220>
 <223> aa sequence derived from ORF of nucleotide
 sequence

<400> 9
 atg ccc aga aga cgc aga tcc tcc agc cga cct gtc cgc agg cgc cgc 48
 Met Pro Arg Arg Arg Arg Ser Ser Ser Arg Pro Val Arg Arg Arg Arg
 1 5 10 15
 cgc ccc agg gtg tcc cga cgt cgt cgc agg aga gga cgc cgc agg agg 96
 Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Arg Arg Arg Arg
 20 25 30
 cgt tag 102
 Arg

<210> 10
 <211> 33
 <212> PRT
 <213> Oncorhynchus mykiss
 <223> aa sequence derived from ORF of nucleotide
 sequence

<400> 10
 Met Pro Arg Arg Arg Arg Ser Ser Ser Arg Pro Val Arg Arg Arg Arg
 1 5 10 15
 Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Arg Arg Arg Arg
 20 25 30
 Arg

<210> 11
 <211> 102
 <212> DNA
 <213> Oncorhynchus keta

<220>
 <221> CDS
 <222> (1)..(99)

<220>
 <223> aa sequence derived from ORF of nucleotide
 sequence

<400> 11
 atg ccc aga aga cgc aga tcc tcc agc cga cct gtc cgc agg cgc cgc 48
 Met Pro Arg Arg Arg Arg Ser Ser Ser Arg Pro Val Arg Arg Arg Arg
 1 5 10 15
 cgc cct agg gtg tcc cga cgt cgt cgc agg aga gga ggc cgc agg agg 96
 Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg
 20 25 30
 cgt tag 102
 Arg

<210> 12
 <211> 33
 <212> PRT
 <213> Oncorhynchus keta
 <223> aa sequence derived from ORF of nucleotide
 sequence

<400> 12
 Met Pro Arg Arg Arg Arg Ser Ser Ser Arg Pro Val Arg Arg Arg Arg
 1 5 10 15
 Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg
 20 25 30
 Arg

<210> 13
 <211> 102
 <212> DNA

<213> Oncorhynchus mykiss

<220>

<221> CDS

<222> (1)..(99)

<220>

<223> nucleotide sequence derived from amino acid
sequence

<400> 13

atg	ccc	aga	aga	cgc	aga	tcc	tcc	agc	cga	cct	gtc	cgc	agg	cgc	cgc	48
Met	Pro	Arg	Arg	Arg	Arg	Ser	Ser	Ser	Arg	Pro	Val	Arg	Arg	Arg	Arg	
1				5					10					15		

cgc	gcn	agg	gtg	tcc	cga	cgt	cgt	cgc	agg	aga	gga	ggc	cgc	agg	agg	96
Arg	Ala	Arg	Val	Ser	Arg	Arg	Arg	Arg	Arg	Arg	Gly	Gly	Arg	Arg	Arg	
			20					25					30			

cgt	tag															102
Arg																

<210> 14

<211> 33

<212> PRT

<213> Oncorhynchus mykiss

<223> nucleotide sequence derived from amino acid
sequence

<400> 14

Met	Pro	Arg	Arg	Arg	Arg	Ser	Ser	Ser	Arg	Pro	Val	Arg	Arg	Arg	Arg	
1					5				10					15		

Arg	Ala	Arg	Val	Ser	Arg	Arg	Arg	Arg	Arg	Arg	Gly	Gly	Arg	Arg	Arg	
			20					25					30			

Arg

<210> 15

<211> 96

<212> DNA

<213> Oncorhynchus mykiss

<220>

<221> CDS

<222> (1)..(93)

<220>

<223> nucleotide sequence derived from amino acid
sequence

<400> 15

atg	ccc	aga	aga	cgc	aga	gcn	agc	cga	cgn	gtc	cgc	agg	cgc	cgc	cgc	48
Met	Pro	Arg	Arg	Arg	Arg	Ala	Ser	Arg	Arg	Val	Arg	Arg	Arg	Arg	Arg	
1				5						10					15	

ccc	agg	gtg	tcc	cga	cgt	cgc	agg	aga	gga	ggc	cgc	agg	agg	cgt	tag	96
Pro	Arg	Val	Ser	Arg	Arg	Arg	Arg	Arg	Gly	Gly	Arg	Arg	Arg	Arg	Arg	
			20					25						30		

<210> 16

<211> 31

<212> PRT

<213> Oncorhynchus mykiss

<223> nucleotide sequence derived from amino acid
sequence

<400> 16

Met	Pro	Arg	Arg	Arg	Arg	Ala	Ser	Arg	Arg	Val	Arg	Arg	Arg	Arg	Arg	
1				5						10					15	

Pro	Arg	Val	Ser	Arg	Arg	Arg	Arg	Arg	Gly	Gly	Arg	Arg	Arg	Arg	Arg	
			20					25						30		

<210> 17

<211> 96

<212> DNA

<213> Oncorhynchus mykiss

<220>

<221> CDS

<222> (1)..(93)

<220>

<223> nucleotide sequence derived from amino acid
sequence

<400> 17

atg	ccc	aga	aga	cgc	aga	gcn	agc	cga	cgn	ath	cgc	agg	cgc	cgc	cgc	48
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----

Met Pro Arg Arg Arg Arg Ala Ser Arg Arg Ile Arg Arg Arg Arg Arg
 1 5 10 15

ccc agg gtg tcc cga cgt cgc agg aga gga ggc cgc agg agg cgt tag 96
 Pro Arg Val Ser Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg Arg
 20 25 30

<210> 18

<211> 31

<212> PRT

<213> Oncorhynchus mykiss

<223> nucleotide sequence derived from amino acid
 sequence

<400> 18

Met Pro Arg Arg Arg Arg Ala Ser Arg Arg Ile Arg Arg Arg Arg Arg
 1 5 10 15

Pro Arg Val Ser Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg Arg
 20 25 30

<210> 19

<211> 102

<212> DNA

<213> Oncorhynchus mykiss

<220>

<221> CDS

<222> (1)..(99)

<220>

<223> nucleotide sequence derived from amino acid
 sequence

<400> 19

atg ccc agā agā cgc aga aga tcc tcc agc cga cct ath cgc agg cgc - 48 -
 Met Pro Arg Arg Arg Arg Ser Ser Ser Arg Pro Ile Arg Arg Arg
 1 5 10 15

cgc cgc ccc agg gtg tcc cga cgt cgc agg aga gga ggc cgc agg agg 96
 Arg Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg
 20 25 30

cgt tag

Arg

102

<210> 20

<211> 33

<212> PRT

<213> Oncorhynchus mykiss

<223> nucleotide sequence derived from amino acid
sequence

<400> 20

Met	Pro	Arg	Arg	Arg	Arg	Arg	Ser	Ser	Ser	Arg	Pro	Ile	Arg	Arg	Arg
1				5					10					15	

Arg	Arg	Pro	Arg	Val	Ser	Arg	Arg	Arg	Arg	Arg	Gly	Gly	Arg	Arg	Arg
			20					25					30		

Arg

<210> 21

<211> 96

<212> DNA

<213> Clupea harengus

<220>

<221> CDS

<222> (1)..(93)

<220>

<223> nucleotide sequence derived from amino acid
sequence

<400> 21

atg	ccc	aga	aga	cgc	acc	aga	cgc	gcn	agc	cga	cct	gtc	cgc	agg	cgc	48
Met	Pro	Arg	Arg	Arg	Thr	Arg	Arg	Ala	Ser	Arg	Pro	Val	Arg	Arg	Arg	
1				5				10						15		

cgc	ccc	agg	cgc	gtg	tcc	cga	cgt	cgt	cgc	gca	cgc	cgc	agg	agg	tag	96
Arg	Pro	Arg	Arg	Val	Ser	Arg	Arg	Arg	Arg	Ala	Arg	Arg	Arg	Arg	Arg	
			20					25					30			

<210> 22

<211> 31

<212> PRT

<213> Clupea harengus

<223> nucleotide sequence derived from amino acid
sequence

<400> 22

Met Pro Arg Arg Arg Thr Arg Arg Ala Ser Arg Pro Val Arg Arg Arg
1 5 10 15

Arg Pro Arg Arg Val Ser Arg Arg Arg Arg Ala Arg Arg Arg Arg
20 25 30

<210> 23

<211> 99

<212> DNA

<213> Clupea harengus

<220>

<221> CDS

<222> (1)..(96)

<220>

<223> nucleotide sequence derived from amino acid
sequence

<400> 23

atg gcc aga aga cgc aga agc aga cgc gcn agc cga cct gtc cgc agg 48
Met Ala Arg Arg Arg Ser Arg Arg Ala Ser Arg Pro Val Arg Arg
1 5 10 15

cgc cgc ccc agg cgc gtg tcc cga cgt cgt cgc gca cgc cgc agg agg 96
Arg Arg Pro Arg Arg Val Ser Arg Arg Arg Arg Ala Arg Arg Arg Arg
20 25 30

tag 99

<210> 24

<211> 32

<212> PRT

<213> Clupea harengus

<223> nucleotide sequence derived from amino acid
sequence

<400> 24

Met Ala Arg Arg Arg Arg Ser Arg Arg Ala Ser Arg Pro Val Arg Arg
1 5 10 15

Arg Arg Pro Arg Arg Val Ser Arg Arg Arg Arg Ala Arg Arg Arg Arg
 20 25 30

<210> 25

<211> 99

<212> DNA

<213> Clupea harengus

<220>

<221> CDS

<222> (1)..(96)

<220>

<223> nucleotide sequence derived from amino acid
 sequence

<400> 25

atg gcc aga aga cgc aga tcc tcc agc cga cct ath cgc agg cgc cgc 48
 Met Ala Arg Arg Arg Arg Ser Ser Ser Arg Pro Ile Arg Arg Arg Arg
 1 5 10 15

ccc agg cgc cgg acc aca cgt cgt cgc agg gca ggc cgc agg agg cgt 96
 Pro Arg Arg Arg Thr Thr Arg Arg Arg Arg Ala Gly Arg Arg Arg Arg
 20 25 30

tag 99

<210> 26

<211> 32

<212> PRT

<213> Clupea harengus

<223> nucleotide sequence derived from amino acid
 sequence

<400> 26

Met-Ala-Arg Arg Arg Arg -Ser Ser Ser Arg-Pro Ile Arg Arg -Arg-Arg -
 1 5 10 15

Pro Arg Arg Arg Thr Thr Arg Arg Arg Arg Ala Gly Arg Arg Arg Arg
 20 25 30

<210> 27

<211> 111

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: consensus 1

<400> 27

atgscagaa gacgcagaas cagaysckn agmcsacstr thcgcaggcg ccgccgcscy 60
aggcgcskgw ccmsacgtcg tcgcaggaga gsasgccgca ggaggcgta g 111

<210> 28

<211> 102

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: consensus 2

<400> 28

atgccccgnc gncgccgntc ctccagccga cctgtccgcc gncgccgccg cccccgngtg 60
tcccgacgtc gtcgccgncg nggaggccgc cgnccgncgtt ag 102

<210> 29

<211> 102

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: consensus 3

<400> 29

atgccgcggc gccgccggtc gtcgagccgc ccggtgcgtc gccggcgccg cccgcgggtc 60
tcgcgccgcc gccggcgccg cggcggccgc cggcgccgct ga 102

<210> 30

<211> 102

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: consensus 4

<400> 30

atgccgcgcc gtcgccgtag ctcgagccgt ccggtgcgtc gccgtcgccg tccccgtgtc 60
agccgccgcc gccgtcgccg cggcggaacgc cgtcgccgtt ga 102

<210> 31
<211> 102
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: consensus 5

<400> 31
atgccgcggc gtcggcgag ctccagccgt ccagtcggc gccgtcgccg ccccggtgtc 60
tcgcgccgc gccggcgcc cggcggacgc cgtcgccgt ga 102

<210> 32
<211> 102
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: ebl 1

<400> 32
atgcgcggc gtcggcgtag ctccagccgt ccagtcgtc gccgtcgccg ccccggtgtc 60
tcgcgccgc gccggcgcc cggcggacgc cgtcgccgtt ga 102

<210> 33
<211> 36
<212> PRT
<213> Artificial Sequence

<220>
<223> aa position 1: X= zero or M

<220>
<223> aa position 2: X= A or P

<220>
<223> aa position 6: X= zero or R

<220>
<223> aa position 7: X=zero or T or S

<220>
<223> aa position 8: X= zero or R

<220>

<223> aa position 9: X=zero or R or S

<220>

<223> aa position 10: X= S or A

<220>

<223> aa position 11: X= S or R

<220>

<223> aa position 12: X= R or P

<220>

<223> aa position 13: X= P or R

<220>

<223> aa position 14: X= V or I

<220>

<223> aa position 19: X= zero or R

<220>

<223> aa position 20: X= P or A

<220>

<223> aa position 22: X= zero or R

<220>

<223> aa position 23: X= V or R

<220>

<223> aa position 24: X= S or T

<220>

<223> aa position 25: X= R or T

<220>

<223> aa position 29: X= zero or R

<220>

<223> aa position 30: X= zero or R

<220>

<223> aa position 31: X= G or A

<220>

<223> aa position 32: X= G or R

<220>

<223> aa position 36: X= zero or R

<220>

<223> Description of Artificial Sequence: consensus
sequence

<400> 33

Xaa Xaa Arg Arg Arg Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Arg Arg
1 5 10 15

Arg Arg Xaa Xaa Arg Xaa Xaa Xaa Xaa Arg Arg Arg Xaa Xaa Xaa Xaa
20 25 30

Arg Arg Arg Xaa
35

<210> 34

<211> 227

<212> DNA

<213> Artificial Sequence

<220>

<221> CDS

<222> (43)..(108)

<220>

<221> CDS

<222> (109)..(207)

<220>

<223> Description of Artificial Sequence: cloning
sequence for expression of Protamine

<220>

<221> sig_peptide

<222> (43)..(108)

<223> pelB gene

<220>

<221> misc_feature

<222> (1)..(6)

<223> XbaI restriction site

<220>

<221> misc_feature

<222> (222)..(227)

<223> Bam HI restriction site

<220>

<221> RBS

<222> (28)..(33)

<223> IRES sequence

<220>

<221> gene

<222> (109)..(207)

<223> ebl 1 gene

<400> 34

tctagaaata attttgttta actttaagaa ggagatatac at atg aaa tac ctg 54
Met Lys Tyr Leu
1

ctg ccg acc gct gct gct ggt ctg ctg ctc ctc gct gcc cag ccg gcg 102
Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala Ala Gln Pro Ala
5 10 15 20

atg gcc atg ccg cgg cgt cgg cgt agc tcc agc cgt cca gtg cgt cgc 150
Met Ala Met Pro Arg Arg Arg Arg Ser Ser Ser Arg Pro Val Arg Arg
25 30 35

cgt cgc cgc ccc cgt gtc tcg cgc cgc cgc cgg cgc cgc ggc gga cgc 198
Arg Arg Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg
40 45 50

cgt cgc cgt tgaggaatta attcggatcc 227
Arg Arg Arg
55

<210> 35

<211> 22

<212> PRT

<213> Artificial Sequence

<223> Description of Artificial Sequence: cloning
sequence for expression of Protamine

<400> 35

Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Ala
1 5 10 15
Ala Gln Pro Ala Met Ala
20

<210> 36

<211> 33

<212> PRT

<213> Artificial Sequence

<223> Description of Artificial Sequence: cloning
sequence for expression of Protamine

<400> 36

Met Pro Arg Arg Arg Arg Ser Ser Ser Arg Pro Val Arg Arg Arg Arg

1

5

10

15

Arg Pro Arg Val Ser Arg Arg Arg Arg Arg Arg Gly Gly Arg Arg Arg

20

25

30

Arg